

NAUCORIDAE (HETEROPTERA) OF NEW GUINEA. IV.
A REVISION OF THE GENUS *CAVOCORIS* WITH
DESCRIPTIONS OF FOUR NEW SPECIES

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Abstract.—The genus *Cavocoris* is revised based on recent collections from Papua New Guinea, and its generic characters are compared to other endemic Papuan genera. Four new species are described: *C. rotundatus*, *C. ibatiri*, *C. minor*, and *C. ismayi*. A key to species, a species distribution map, and illustrations of key characters are provided.

The monotypic genus *Cavocoris* was described by La Rivers (1971) to hold *C. bisulcus*, based on a single female type from what is now the Indonesian province of Irian Jaya. This species has a deep pit on the posterior margin of abdominal paratergite III, a character that La Rivers considered to be diagnostic for the genus as a whole. Our recent collections in Papua New Guinea, however, have revealed four additional species of *Cavocoris*, two of which lack pits on paratergite III. Furthermore the pits are a sexually dimorphic character, being present only in the females of those species which possess them. These pits are not associated with the spiracle on paratergite III and must instead have a separate function, possibly sensory or secretory. In particular, the presence of a tapering glabrous channel leading outward from each pit suggests a flow path for secretory products. This "flow channel" leads to one of two paired ovate glabrous patches set into the hydrofuge pile of paratergite III (Fig. 3); these ovate patches, whose function is not known but is presumed to be sensory on the basis of their location and appearance, occur on other abdominal paratergites which lack pits, and in many other naucorid taxa. The structure and function of similarly located "sense organs" in several plastron breathing naucorid genera was discussed by Polhemus (1986), but in these swift water genera the abdominal and thoracic paratergites bear ovate depressions that are not paired or glabrous as in *Cavocoris* and other slow water species. It is hypothesized that the structure of these "sense organs" is closely linked to habitat, and that modified types may have evolved independently in several naucorid lineages whose members have shifted from ancestral slow water habitats to swift streams (Polhemus and Polhemus, 1986a).

La Rivers (1971) compared *C. bisulcus* to *Sagocoris biroi* Montandon, noting that it differed from the latter in the presence of abdominal pits, by certain head modifications discussed below, and by the shape of the posterolateral angles of the pronotum. The only specimen at his disposal, however, was the female type of *C. bisulcus*, which is macropterous and thus has a pronotal shape different from typical brachypterous morphs (Figs. 1, 4). The brachypterous forms, which we have found to be far more common, generally have a broadly arcuate pronotal margin that forms an acute angle posterolaterally. *Cavocoris* does share with *Sagocoris* and *Aptinocoris* a reduced and truncate male left paramere and a distinctly asymmetrical vesica with a membranous tip, but we have found that far better key characters for distinguishing

Cavocoris from these genera lie in the structure of the head, particularly in the anteclypeal margin which forms a smooth projecting lip (Fig. 2) without a distinct notch above the base of the labrum as is encountered in *Sagocoris* and *Aptinocoris*. The labrum itself is also characteristic, coming to a point apically in a condition reminiscent of the New World *Limnocoris*. These head modifications and the presence of short pale club-like setae on the hemelytra of certain species represent synapomorphies allying *Cavocoris* to the Papuan *Nesocricos*, these two genera apparently representing sister groups that have diverged from the more plesiomorphic *Sagocoris* lineage. *Nesocricos* is further defined by several autapomorphies, including an elongate body shape reminiscent of Belostomatidae, and the presence of cup-like sense organs at the anterolateral angles of the proepimeron.

La Rivers separated *Cavocoris* from *Warisia*, another related genus in the *Sagocoris* complex, by the number of transverse rows of spines on the mesotibia. We feel this character is rather subjective, however, since these spine rows are variable in size and often difficult to count, and would note that the head structures of the two genera once again provide a much more reliable method of separation. In *Warisia* the anteclypeal structure is intermediate between *Sagocoris-Aptinocoris* and *Cavocoris-Nesocricos*, with a shallow indentation in the anteclypeal margin above the extremely recessed labrum, flanked by large ovate depressions of a presumably sensory nature. The abdominal venter of *Warisia* is also different, bearing a longer and less densely appressed hydrofuge pile than in *Cavocoris*, causing it to appear dark brown instead of shining gold. In addition, the "sense organs" on the abdominal paratergites in *Warisia* consist of one to four irregular elongate glabrous patches rather than the paired ovate patches as discussed above for *Cavocoris*. Finally, the male parameres in *Warisia* are of approximately equal size, while in *Cavocoris* the left paramere is reduced.

All of the above genera are classified as members of the subfamily Cheirochelinae by La Rivers (1971), but as we have indicated previously (Polhemus and Polhemus, 1986b; D. Polhemus, 1986) this subfamily is almost undoubtedly polyphyletic and the assignation of these taxa to it is dubious. The vertex of *Cavocoris* is not produced posteriorly behind the eyes, thus it will not even key to the Cheirochelinae in Usinger's (1941) key.

All measurements and proportions are given in millimeters. CL numbers refer to codes used by the authors to reference ecological data. Specimen depository abbreviations are indicated in the acknowledgments. This research was sponsored in part by a grant from the National Geographic Society, Washington, D.C.

KEY TO THE SPECIES OF *CAVOCORIS* LA RIVERS

Note: the keys to males and females contain different sets of species, since certain species are known only from a single sex.

Males

1. Length less than 9.5 *C. minor*
- Length exceeding 10.0 2
2. Pronotum set with short stout pale setae; overall length exceeding 11.5 *C. ibatiri*
- Pronotum lacking short stout pale setae; overall length less than 11.0 *C. rotundatus*

Females

1. Abdominal paratergite III bearing a distinct pit (Fig. 3) 2
- Abdominal paratergite III not bearing a pit *C. ismayi*
2. Sternite VI with projections on posterior margin at base of subgenital plate (Fig. 14) *C. bisulcus*
- Sternite VI lacking projections on posterior margin (Figs. 11, 12) 3
3. Subgenital plate with indentation at tip (Fig. 11); pit on abdominal paratergite III deep *C. rotundatus*
- Subgenital plate lacking an indentation at tip (Fig. 12); pit on abdominal paratergite III shallow *C. ibatiri*

Cavocoris bisulcus La Rivers

Figs. 4, 14

Cavocoris bisulcus La Rivers, 1971, 2:57.

Diagnosis. This species may be recognized by the pair of rounded projections on the posterior margin of abdominal sternite VI in females and by the deeply indented apex of the female subgenital plate (Fig. 14). The third abdominal paratergite bears a deep pit, and the posterolateral angles of abdominal tergites III–V are moderately produced. The male is unknown.

Discussion. We have examined the type and only known specimen of this species, a macropterous female taken by Evelyn Cheesman in the Cyclops Mountains behind present day Jayapura in Indonesian New Guinea. The distinctive female subgenital morphology will separate it from all other known *Cavocoris* species.

Material examined. INDONESIA, Irian Jaya: 1 female, Sabron, Cyclops Mtns., 930 ft (283 m), VI-36, B.M. 1936-271, L. E. Cheesman (holotype, BMNH).

Cavocoris rotundatus, new species

Figs. 1–3, 5, 6, 11

Diagnosis. *C. rotundatus* may be recognized by the deep pit along the posterior margin of abdominal paratergite III in females (Fig. 3), the absence of protuberances on the posterior margin of female abdominal sternite VI, the indentate apex of the female subgenital plate (Fig. 11), and the structure of the male parameres (Figs. 5, 6).

Description. Brachypterous form: Of moderate size, ovate, basic coloration dull yellowish brown with scattered dark brown or black markings. Male length 10.46; maximum width (across abdomen) 7.49 mm; female length 10.56; maximum width 7.68.

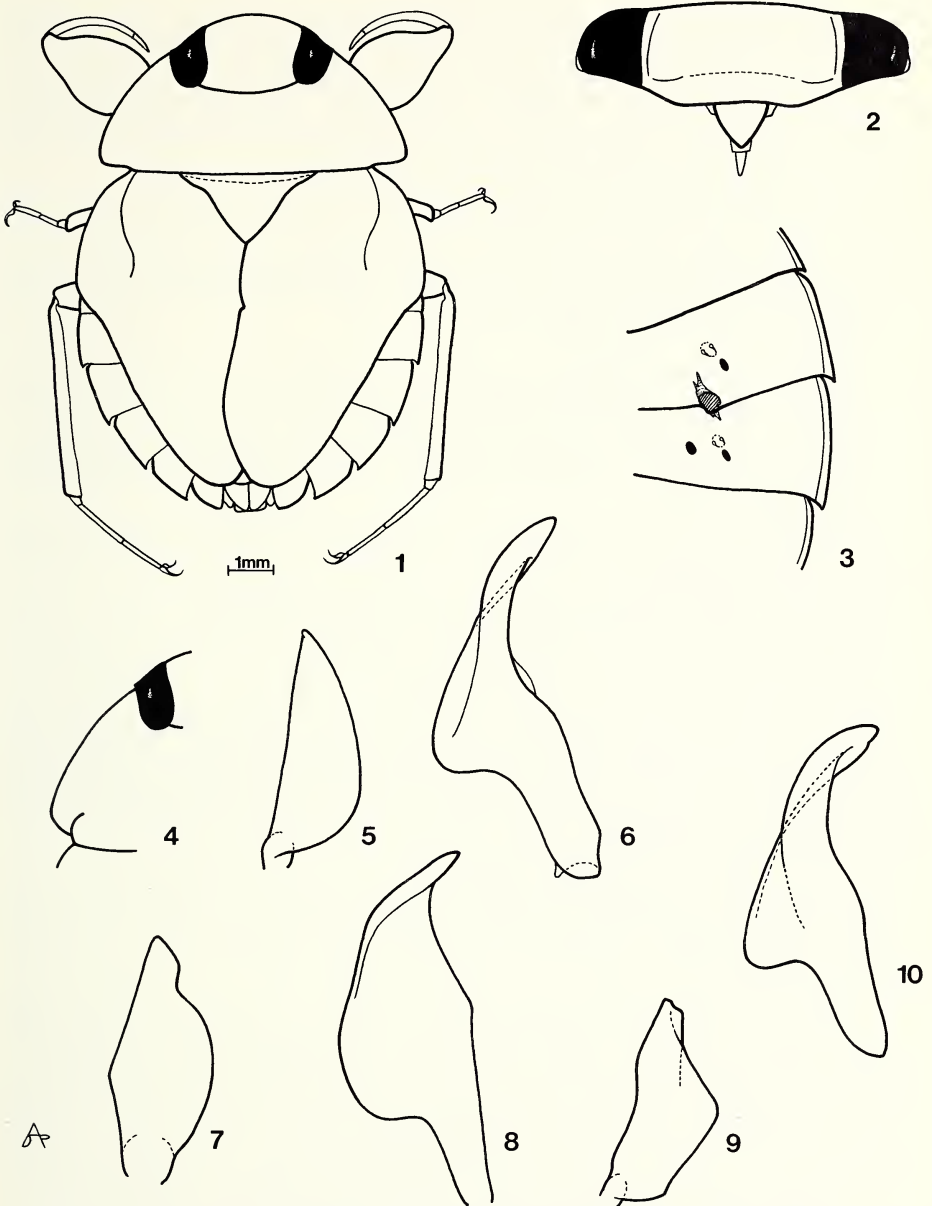
Head dark yellowish, with longitudinal dark brown stripe medially and transverse dark markings at posterior margin of vertex, width/length = 3.50/2.21; eyes brown, shining, width/length = 0.77/1.54, dorsal surfaces flat, not rising above plane of vertex, inner margins divergent anteriorly, separated from vertex by shallow furrows set with very short pale setae, anterior/posterior interocular width = 2.06/1.92, lateral flange small, glabrous; posterior margin of vertex weakly and broadly rounded, barely produced behind eyes; anteclypeus with anterior margin broadly rounded, barely projecting ahead of eyes, produced beyond base of labrum for distance less than

length of labrum, bearing shallow depressions to either side of midline; labrum triangular, coming to acute point distally, light brown; maxillary plates moderately developed, oriented at angle approximately 45° from vertical, anterior margins glabrous, carinate, forming sides of rostral cavity; rostrum yellowish basally, second segment gold, glabrous, extending beyond labrum; antennae slender, filiform, yellowish, segment IV glabrous, barely extending beyond lateral eye margin.

Pronotum dark yellowish, mottled centrally with dark brown and black at muscle attachments, weakly depressed medially behind vertex, width/length (midline) = 6.53/1.73, lateral margins narrowly glabrous, broadly rounded, posterolateral angles acutely rounded, posterior margin nearly straight, not sinuate. Scutellum dark brown, width/length (midline) = 2.88/1.44, lateral margins weakly sinuate, transverse sulcus present along anterior margin. Hemelytra dark brown, lighter brown bordering scutellum, posteromedially, and along inner margin of embolium, embolium dark yellow, surface of corium coarsely rugose, entire hemelytral surface bearing fine pale granular microstructure and scattered short stout erect pale setae, tips of hemelytra rounded, extending to base of genital segment, embolium demarcated by deep narrow furrow on inside margin, posterior margin obscure, lateral margin narrowly glabrous, bearing long recumbent gold setae, hemelytral commissure with small triangular tab on left hemelytron fitting into corresponding triangular indentation on right hemelytron.

Abdomen with lateral portions of segments II–VIII exposed, dark yellow, with dark brown markings along anterior margins, lateral margins of all segments bearing recumbent gold setae, these setae becoming longer and forming tufts at posterolateral angles of segments V–VIII, posterolateral angles of segments III and IV moderately produced and spinose, angles of segments V–VII acute, tips of projections on segment VIII rounded.

Ventral surface light brown, with head, prosternum, mesosternum centrally, and abdomen covered with thick recumbent gold hydrofuge pile; head with prominent glabrous median longitudinal keel lacking dentation and having weak posterior projection over similar and continuous structure on prosternum; proepimeron densely covered with very short fine recumbent gold setae, inner projections not touching medially; mesosternal plate sharply reflexed along anterior margin, coming to acute subconical point anteromedially, point separated by transverse sulcus from broad tumescence posteromedially; females with deep pit present centrally along posterior margin of abdominal paratergite III and anterior margin of paratergite IV; abdominal paratergites II–V with paired ovate glabrous pits adjacent to spiracle, spiracle represented by small raised protruberance thickly covered with gold hydrofuge setae, paratergites VI and VII each with single glabrous pit, all paratergites with lateral margins narrowly glabrous. Legs dark yellowish, anterior femora with thick pad of gold setae along anterior margin, fringe of long fine gold setae along posterior margin; anterior tibia slender, gently curving, with short gold setae on inner face, anterior tarsi single segmented, claw tiny, obscure, fused to tarsus; middle and hind coxae each bearing single glabrous tubercle distally; middle and hind trochanters with narrow longitudinal fringe of short thick gold setae distally on posterior margins; middle and hind femora bearing scattered short reddish spines along anterior margins, continuous longitudinal rows of short sharp reddish spines along posterior margin on dorsal and ventral faces, single small combs of reddish spines distally on posterior



Figs. 1-10. 1-3. *C. rotundatus* new species. 1. Female, dorsal habitus. 2. Head, anterior view, showing lack of notch above labrum and triangular labrum coming to acute point. 3. Ventral view of abdominal paratergites III and IV, showing location of deep pit, spiracles, and small ovate glabrous patches in hydrofuge pile. 4. *C. bisulcus* La Rivers. Lateral margin of pronotum in macropterous individual. 5-10. *Cavocoris* species, male parameres. 5. *C. rotundatus* new species, left paramere. 6. *C. rotundatus* new species, right paramere. 7. *C. ibatiri* new species, left paramere. 8. *C. ibatiri* new species, right paramere. 9. *C. minor* new species, left paramere. 10. *C. minor* new species, right paramere.

margins; middle femur with thick pad of short gold setae on posterior face; middle and posterior tibiae and posterior tarsi thickly set with longitudinal rows of stout reddish spines, these spines longer and more dense distally; middle tarsi lacking spines dorsally, bearing longitudinal rows of short reddish spines ventrally; middle and posterior femora, tibia and tarsi set with gold swimming hairs on posterior margins; claws gold, sharply bent; parempodia setiform.

Female subgenital plate trapezoidal on basal half, apical half narrowed with sides parallel, tip broadly and shallowly indented; abdominal sternite VI lacking projections on posterior margin adjacent to base of subgenital plate (Fig. 11). Male parameres asymmetrical; left paramere smaller, leaf shaped; right paramere gently curving, with rounded projection laterally (Figs. 5, 6).

Macropterous form: unknown.

Discussion. The type locality was a clear rocky tributary to the Wampit River, descending from the Herzog Mountains through lush primary rain forest. The type series was taken in a shallow reach with a gravel substrate and moderate current.

Etymology. The name "rotundatus" refers to the nearly circular shape of this species when viewed from above.

Holotype. Male, allotype, female: PAPUA NEW GUINEA, Morobe Province, stream 17.8 km N of Mumeng on Wau rd., September 19, 1983, CL 1835, J. T. and D. A. Polhemus (BPBM).

Paratypes. 1 male, 2 females, same data as holotype (JTFC).

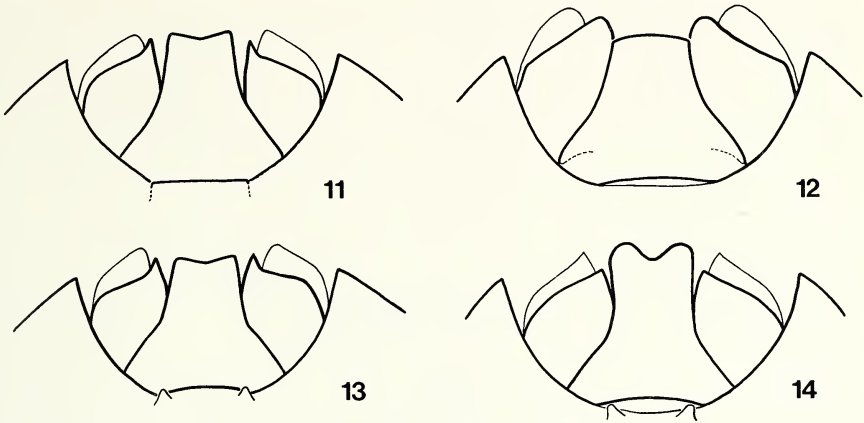
Cavocoris ibatiri, new species

Figs. 7, 8, 12

Diagnosis. This species, the largest in the genus, may be recognized by its size (length exceeding 11.50), the presence of erect pale peg-like setae on the pronotum and scutellum in addition to the hemelytra, the presence of a pit on abdominal paratergite III in females, the structure of the female subgenital plate (Fig. 12), and the shapes of the male parameres (Figs. 7, 8).

Description. Brachypterous form: Large for genus, shape elongate ovate, basic coloration dull yellowish brown broadly and diffusely marked with dark brown. Male length 11.81; maximum width (across abdomen) 8.06; female length 12.48 mm; maximum width 7.97.

Head dark yellowish, with three longitudinal dark brown stripes medially and transverse dark markings at posterior margin of vertex, width/length = 4.03/2.26; eyes brown, shining, width/length = 0.96/1.92, dorsal surfaces flat, not rising above plane of vertex, inner margins divergent anteriorly, separated from vertex by shallow furrows set with very short pale setae, anterior/posterior interocular width = 2.30/2.06, lateral flange small, glabrous; posterior margin of vertex weakly and broadly rounded, barely produced behind eyes; anteclypeus with anterior margin broadly rounded, barely projecting ahead of eyes, produced beyond base of labrum for distance less than length of labrum, bearing shallow depressions to either side of midline; labrum triangular, acutely rounded apically, light brown; maxillary plates moderately developed, oriented at angle approximately 45° from vertical, anterior margins glabrous, carinate, forming sides of rostral cavity; rostrum yellowish basally, tip glabrous, distal two segments extending beyond labrum; antennae slender, filiform, yellowish, segment IV barely extending beyond lateral eye margin.



Figs. 11–14. *Cavocoris* species, female subgenital plates. 11. *C. rotundatus* new species. 12. *C. ibatiri* new species. 13. *C. ismayi* new species. 14. *C. bisulcus* La Rivers.

Pronotum yellowish brown, mottled centrally with dark brown at muscle attachments, weak ovate depression present centrally, width/length (midline) = 7.15/2.21, lateral margins narrowly glabrous, broadly rounded, posterolateral angles acutely rounded, posterior with weak sinuations to either side of midline at point of contact with lateral embolar margins; entire pronotal surface set with short erect pale peg-like setae. Scutellum dark brown, width/length (midline) = 3.46/1.82, surface coarsely rugose, set with short erect pale peg-like setae, lateral margins weakly sinuate, transverse sulcus present along anterior margin. Hemelytra dark brown, lighter brown in narrow irregular patches bordering scutellum and posteromedially, anterior portion of embolium dark yellow, membrane black, surface of corium coarsely rugose, entire hemelytral surface bearing fine pale granular microstructure and scattered short erect pale peg-like setae, tips of hemelytra rounded, extending to posterior margin of abdominal tergite V in males and to posterior margin of abdominal tergite VI in females, embolium demarcated by deep narrow furrow on inside margin, posterior margin obscure, lateral margin narrowly glabrous, lacking long recumbent gold setae, hemelytral commissure with small triangular tab on left hemelytron fitting into corresponding triangular indentation on right hemelytron.

Abdomen with lateral portions of segments II–VIII exposed, brown, with darker markings along posterior and lateral margins, lateral margins of all segments bearing fringe of gold setae, with tufts of long gold setae arising inside of lateral margins near middle, posterolateral angles of segments II–VI acute, not produced or spinose, angles of segments VII and VIII in females and VIII in males rounded.

Ventral surface light brown, with head, prosternum, basal portions of propleurae, mesosternum centrally, hind coxae and abdomen covered with thick recumbent gold hydrofuge pile; head with prominent glabrous median longitudinal keel lacking dentation and evenly meeting similar and continuous structure on prosternum; ventral margin of prosternal keel rising to gentle obtuse angle when viewed laterally; proepimeron densely covered with very short fine recumbent gold setae, inner projections not touching medially; mesosternal plate sharply reflexed along anterior margin,

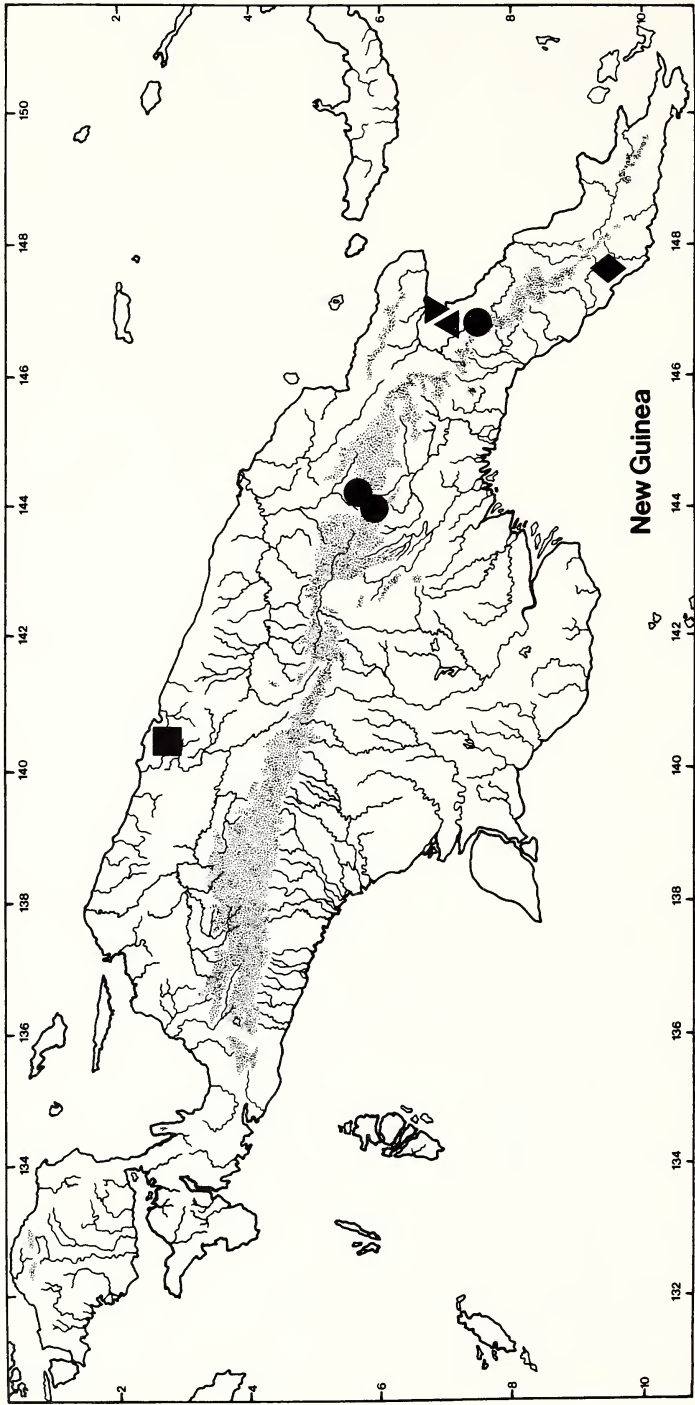


Fig. 15. Distribution of *Cavocoris* species in New Guinea. Areas above 2000 m stippled. ■—*C. bisulcus* La Rivers. ●—*C. ibatiri* new species. ▲—*C. rotundatus* new species. ▼—*C. minor* new species. ◆—*C. ismayi* new species.

coming to acute subconical point anteromedially, point separated by transverse sulcus from broad tumescence posteromedially; females with deep pit present centrally along posterior margin of abdominal paratergite III; abdominal paratergites IV–VII with paired ovate glabrous pits adjacent to spiracle, spiracle represented by small raised protruberance thickly covered with gold hydrofuge setae, paratergites II and III each with single glabrous pit, all paratergites with lateral margins narrowly glabrous. Legs dark yellowish, anterior femora with thick pad of gold setae along anterior margin, fringe of long fine gold setae along posterior margin; anterior tibia slender, gently curving, with short gold setae on inner face, anterior tarsi single segmented, claw tiny, obscure, fused to tarsus; middle and hind coxae each bearing single glabrous tubercle distally; middle and hind trochanters with narrow longitudinal fringe of short thick gold setae distally on posterior margins; middle and hind femora bearing scattered short reddish spines along anterior margins, continuous longitudinal rows of short sharp reddish spines along posterior margin on dorsal and ventral faces, single small combs of reddish spines distally on posterior margins; middle femur with narrow longitudinal patch of thick short gold setae along posterior face, middle and posterior tibiae and posterior tarsi thickly set with longitudinal rows of stout reddish spines, these spines longer and more dense distally; middle tarsi lacking spines dorsally, bearing longitudinal rows of very short spines on ventral face; middle and posterior femora, tibia and tarsi set with gold swimming hairs on posterior margins; claws gold, sharply bent; parempodia setiform.

Female subgenital plate trapezoidal on basal half with glabrous patches laterally, apical half narrowed with sides parallel, tip broadly rounded; abdominal sternite VI lacking projections on posterior margin adjacent to base of subgenital plate (Fig. 12). Male parameres asymmetrical; left paramere truncate, with blunt projection at tip; right paramere gently curving, with slender apical projection (Figs. 7, 8).

Macropterous form: unknown.

Discussion. *C. ibatiri* is by far the most distinctive species in the genus, and differs from other species of *Cavocoris* in several respects. In all other species in which the female is known the subgenital plate is indented apically, whereas in *C. ibatiri* it is broadly rounded at the tip. The male right paramere is also much different in shape than in the other species for which this character is known (Figs. 6, 8, 10), and the overall shape of the body is massive and elongate, rather than rotund when viewed from above. The dorsum is set with short pale club-like setae, a character state found in no other Papuan genus except *Nesocricos*, and this, in concert with the somewhat elongate body shape mentioned above, indicates that *C. ibatiri* is an annectant taxon linking *Nesocricos* and *Cavocoris*.

The type locality was a small ankle deep stream approximately 3 meters wide mostly shaded by primary rain forest. The type series was taken in a shallow rocky riffle where a gap in the surrounding forest allowed sunlight to reach the stream.

Etymology. The name “ibatiri” is a noun in apposition and refers to a water spirit believed to dwell in the rivers of the Papuan highlands.

Holotype. Male, allotype, female: PAPUA NEW GUINEA, Western Highlands Province, small stream at Baiyer River Bird of Paradise sanctuary, September 8, 1983, CL 1792, J. T. and D. A. Polhemus (BPBM).

Paratypes. PAPUA NEW GUINEA. Western Highlands Province: 3 males, 1 female, same data as holotype (JTPC); 1 male, 1 female, Trauna River, nr. Baiyer

River, September 8, 1983, CL 1793, J. T. and D. A. Polhemus (JTPC). Morobe Province: 1 female, Bulolo River, E of Wau, 900 m (2,950 ft), October 25, 1964, W. L. and J. G. Peters (LACM); 2 females, stream 17.8 km N of Mumeng on Wau rd., September 19, 1983, J. T. and D. A. Polhemus (JTPC).

Cavocoris minor, new species

Figs. 9, 10

Diagnosis. *C. minor*, the smallest species so far known in the genus, may be recognized by its small size (length less than 10.00), narrow pronotum (less than 6.00 in width), the tufts of setae on the posterolateral angles of the abdominal segments, and the structure of the male parameres (Figs. 9, 10). The female is presently unknown.

Description. Brachypterous male: Of moderate size, ovate, basic coloration dull yellowish brown with scattered dark brown or black markings. Length 9.12; maximum width (across abdomen) 6.62.

Head dark yellowish, with longitudinal dark brown stripe medially and transverse dark markings at posterior margin of vertex, width/length = 3.22/2.02; eyes black, shining, width/length = 0.72/1.39, dorsal surfaces flat, not rising above plane of vertex, inner margins divergent anteriorly, separated from vertex by shallow furrows set with very short pale setae, anterior/posterior interocular width = 1.92/1.73, lateral flange small, glabrous; posterior margin of vertex weakly and broadly rounded, barely produced behind eyes; anteclypeus with anterior margin broadly rounded, barely projecting ahead of eyes, produced beyond base of labrum for distance less than length of labrum, bearing shallow depressions to either side of midline; labrum triangular, coming to acute point distally, light brown; maxillary plates moderately developed, oriented at angle approximately 45° from vertical, anterior margins glabrous, carinate, forming sides of rostral cavity; rostrum yellowish basally, second segment gold, glabrous, extending beyond labrum; antennae slender, filiform, yellowish, segment IV glabrous, barely extending beyond lateral eye margin.

Pronotum dark yellowish, mottled centrally with dark brown at muscle attachments, weakly depressed medially behind vertex, width/length (midline) = 5.57/1.54, lateral margins narrowly glabrous, broadly rounded, posterolateral angles acutely rounded, posterior margin nearly straight, not sinuate. Scutellum dark brown, width/length (midline) = 2.88/1.25, lateral margins weakly sinuate, transverse sulcus present along anterior margin. Hemelytra dark brown to black, lighter brown bordering scutellum, embolium dark yellow, surface of corium coarsely rugose, entire hemelytral surface bearing fine pale granular microstructure and scattered short stout erect pale setae, tips of hemelytra rounded, extending to base of genital segment, embolium demarcated by deep narrow furrow on inside margin, posterior margin obscure, lateral margin narrowly glabrous, bearing long recumbent gold setae, hemelytral commissure with small triangular tab on left hemelytron fitting into corresponding triangular indentation on right hemelytron.

Abdomen with lateral portions of segments II–VIII exposed, dark yellow, with dark brown markings along anterior margins and centrally, lateral margins of all segments bearing recumbent gold setae, these setae becoming longer and forming tufts at posterolateral angles, posterolateral angles of segments III and IV moderately

produced and spinose, angles of segments V–VII acute, tips of projections on segment VIII rounded.

Ventral surface light brown, with head, prosternum, mesosternum centrally, and abdomen covered with thick recumbent gold hydrofuge pile; head with prominent glabrous median longitudinal keel lacking projections and evenly meeting similar and continuous structure on prosternum; proepimeron densely covered with very short fine recumbent gold setae, inner projections not touching medially; mesosternal plate sharply reflexed along anterior margin, coming to acute subconical point anteromedially, point separated by transverse sulcus from broad tumescence posteromedially; abdominal paratergites II–V with paired ovate glabrous pits adjacent to spiracle, spiracle represented by small raised protruberance thickly covered with gold hydrofuge setae, paratergites VI and VII each with single glabrous pit, all paratergites with lateral margins narrowly glabrous. Legs dark yellowish, anterior femora with thick pad of gold setae along anterior margin, fringe of long fine gold setae along posterior margin; anterior tibia slender, gently curving, with short gold setae on inner face, anterior tarsi single segmented, claw tiny, obscure, fused to tarsus; middle and hind coxae each bearing single glabrous tubercle distally; middle and hind trochanters with narrow longitudinal fringe of short thick gold setae distally on posterior margins; middle and hind femora bearing scattered short reddish spines along anterior margin, continuous longitudinal rows of short sharp reddish spines along posterior margin on dorsal and ventral faces, single small combs of reddish spines distally on posterior margins; middle femur with thick pad of short gold setae on posterior face; middle and posterior tibiae and posterior tarsi thickly set with longitudinal rows of stout reddish spines, these spines longer and more dense distally; middle tarsi lacking spines dorsally, bearing longitudinal rows of short reddish spines ventrally; middle and posterior femora, tibia and tarsi set with gold swimming hairs on posterior margins; claws gold, sharply bent; parempodia setiform.

Male parameres asymmetrical; left paramere truncate, with blunt projection at tip; right paramere gently curving, with rounded projection laterally (Figs. 9, 10).

Macropterous form: unknown.

Discussion. The type locality was a deep, swift stream with steep banks flowing through disturbed rain forest. The type series was taken from under a partially submerged tree trunk swept by the current.

Etymology. The name “minor” refers to this species’ small size.

Holotype. Male: PAPUA NEW GUINEA, Morobe Province, stream 39 km SW of Lae on Wau rd., September 15, 1983, CL 1812, J. T. and D. A. Polhemus (BPBM).

Paratypes. 3 males, same data as holotype (JTPC).

Cavocoris ismayi, new species

Fig. 13

Diagnosis. Females of *C. ismayi* may be recognized by the small projections on the posterior margin of abdominal sternite VI, the shape of the subgenital plate (Fig. 13), the small pointed projection on the posterior end of the gular keel on the bottom of the head, and the absence of pits on abdominal paratergite III. The male of this species is presently unknown.

Description. Brachypterous female: Of moderate size, ovate, basic coloration dull

yellowish brown with scattered dark brown or black markings. Length 10.56; maximum width (across abdomen) 7.68.

Head dark yellowish, with longitudinal dark brown stripe medially and transverse dark markings at posterior margin of vertex, width/length = 3.60/2.06; eyes black, shining, width/length = 0.86/1.44, dorsal surfaces flat, not rising above plane of vertex, inner margins divergent anteriorly, separated from vertex by shallow furrows set with very short pale setae, anterior/posterior interocular width = 2.02/1.78, lateral flange small, glabrous; posterior margin of vertex weakly and broadly rounded, barely produced behind eyes; anteclypeus with anterior margin broadly rounded, barely projecting ahead of eyes, produced beyond base of labrum for distance less than length of labrum, bearing shallow depressions to either side of midline; labrum triangular, coming to acute point distally, light brown; maxillary plates moderately developed, oriented at angle approximately 45° from vertical, anterior margins glabrous, carinate, forming sides of rostral cavity; rostrum yellowish basally, second segment gold, glabrous, extending beyond labrum; antennae slender, filiform, yellowish, segment IV glabrous, barely extending beyond lateral eye margin.

Pronotum dark yellowish, mottled centrally with dark brown at muscle attachments, weakly depressed medially behind vertex, width/length (midline) = 6.72/1.63, lateral margins narrowly glabrous, broadly rounded, posterolateral angles acutely rounded, posterior margin nearly straight, not sinuate. Scutellum dark brown, dark yellowish at basal angles, width/length (midline) = 3.36/1.44, lateral margins weakly sinuate, transverse sulcus present along anterior margin. Hemelytra dark brown to black, lighter brown bordering scutellum and in irregular patches posteromedially, embolium dark yellow, surface of corium coarsely rugose, entire hemelytral surface bearing fine pale granular microstructure and scattered short stout erect pale setae, tips of hemelytra rounded, extending to base of abdominal segment VIII, embolium demarcated by deep narrow sinuate furrow on inside margin, posterior margin obscure, lateral margin narrowly glabrous, bearing long fine recumbent gold setae, hemelytral commissure with small triangular tab on left hemelytron fitting into corresponding triangular indentation on right hemelytron.

Abdomen with lateral portions of segments II–VIII exposed, dark yellow, with dark brown markings along anterior margins and adjoining lateral margins, lateral margins of all segments bearing recumbent gold setae, these setae becoming longer and forming tufts at posterolateral angles of segment VII, posterolateral angles of segments III–V weakly produced, angles of segments VI and VII acute, tips of projections on segment VIII acutely rounded.

Ventral surface light brown, with head, prosternum, mesosternum centrally, and abdomen covered with thick recumbent gold hydrofuge pile; head bearing prominent glabrous median longitudinal keel on gula with small pointed projection on posterior end, evenly meeting similar and continuous keel on prosternum; proepimeron densely covered with very short fine recumbent gold setae, inner projections not touching medially; mesosternal plate sharply reflexed along anterior margin, coming to acute subconical point anteromedially, point separated by transverse sulcus from broad tumescence posteromedially; abdominal paratergite III lacking pit along posterior margin; abdominal paratergites II–V with paired ovate glabrous pits adjacent to spiracle, spiracle represented by small raised protruberance thickly covered with gold hydrofuge setae, paratergites VI and VII each with single glabrous pit, all paratergites

with lateral margins narrowly glabrous, sternite VI with two (1 + 1) small rounded projections to either side of midline on posterior margin. Legs dark yellowish, anterior femora with thick pad of gold setae along anterior margin, fringe of long fine gold setae along posterior margin; anterior tibia slender, gently curving, with short gold setae on inner face, anterior tarsi single segmented, claw tiny, obscure, fused to tarsus; middle and hind coxae each bearing single glabrous tubercle distally; middle and hind trochanters with narrow longitudinal fringe of short thick gold setae distally on posterior margins; middle and hind femora bearing scattered short reddish spines along anterior margins, continuous longitudinal rows of short sharp reddish spines along posterior margin on dorsal and ventral faces, single small combs of reddish spines distally on posterior margins; middle femur with thick pad of short gold setae on posterior face; middle and posterior tibiae and posterior tarsi thickly set with longitudinal rows of stout reddish spines, these spines longer and more dense distally; middle tarsi lacking spines dorsally, bearing longitudinal rows of short reddish spines ventrally; middle and posterior femora, tibia and tarsi set with gold swimming hairs on posterior margins; claws gold, sharply bent; parempodia setiform.

Subgenital plate roughly trapezoidal basally, narrowing on apical half with lateral margins parallel, tip with weak indentation (Fig. 13).

Macropterous form: unknown.

Discussion. Eio Creek at the type locality was a clear rocky stream descending from the Sogeri Plateau through primary rain forest. The type specimens were taken amid rocks and gravel in shallow water along the edge of a deep, unshaded, flowing pool.

Etymology. This species is named in honor of John Ismay, who showed us many interesting collecting localities in the vicinity of Port Moresby.

Holotype. Female: PAPUA NEW GUINEA, Central Province, Eio Creek, nr. Baruanum, September 22, 1983, CL 1840, J. T. and D. A. Polhemus (BPBM).

Paratypes. 1 female, same data as holotype (JTTC).

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